DOCUMENT RESUME

ED 108 621 IR 002 137

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TITLE Pedagogical Source Data Identification and Updating Alternatives.
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REPORT NO SWRL-TN-5-72-21
PUB DATE 12 Apr 72
NOTE 9p.

EDRS PRICE MF-$0.76 HC-$1.58 PLUS POSTAGE
DESCRIPTORS Computer Programs; *Data Bases; Data Processing; Design; Electronic Data Processing; *Identification; Information Processing; Information Retrieval; Information Storage; Information Systems; *Management Systems; Recordkeeping; *Student Records; *Students; Systems Development
IDENTIFIERS IMS; *Instructional Management System; Student Identifier

ABSTRACT

The automated identification of students as they progress through an instructional program is described as an essential capability of the Southwest Regional Laboratory's (SWRL) Instructional Management System (IMS). Performance characteristics of procedures for linking data to individual students (whose records are maintained by IMS) are identified, and design considerations for those procedures are indicated through a series of questions and answers. (DGC)

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SWRL

SOUTHWEST REGIONAL LABORATORY
TECHNICAL NOTE

DATE: April 12, 1972

NO: TN 5-72-21

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ABSTRACT

The automated identification of students as they progress through an instructional program is essential to the SWRL Instructional Management System (IMS). This paper presents the performance characteristics of one or more devices and procedures, yet to be developed, which will provide the necessary automated source data capability. Several questions and answers pertaining to the problem are also put forth.

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IR 008 137

PEDAGOGICAL SOURCE DATA IDENTIFICATION AND UPDATING ALTERNATIVES

Statement of Problem

Automated identification of individual students as they move through an instructional program has been a fundamental but often overlooked obstacle to the development of a user-ready instructional management system. When student performance data are submitted, they must be linked with the name of the person generating the performance. There are many dimensions within which the individual must be identified, such as class, school, and district. The engineering problem may be stated in the following question form:

> What device and procedures can be developed that will link individuals with their performance data in a manner that is reliable, inexpensive, and adaptable for use in an instructional management system?

Definition

Source Data Identification and Updating may be defined as a multi-dimensional classification device and procedure that link input with appropriate portions of an initialized data base.

A three-part operational structure is inferred from this definition:

1. initialization
2. data input
3. updating

Updating possesses at least five capabilities:

1. deleting a pupil,
2. adding a pupil,

3. changing a pupil name or code,
4. changing pupil data where inaccuracies are detected, and
5. creating an inactive file.

Each individual, therefore, must be identified within certain dimensions and then be input as a unique entity into a "data base," most likely on a computer storage medium such as tape or disk. Also, provisions must be made for adding and deleting students during the course of a school year. As each performance record is entered into a computer it must be linked to the appropriate person. Whenever errors in data input are discovered, the ability to correct these mistakes should exist.

What IMS Must Identify

In IMS, the student is the originating source of performance data. Individual names must be coded in a manner that is understood by a computer. Most likely, the identification will be numerical, rather than a one-to-one alphabetic relationship between student name and its corresponding code. Once the individual is assigned a code, he must then be linked logically with some or all of the several identifiers listed below in descending hierarchical order.

1. nation
2. cross-state region
3. state
4. within-state region
5. district
6. area within district

7. school
8. class/grade
9. individual
10. instructional program
11. group within program
12. logical partition of instructional program, e.g., Unit 1, Unit 2, etc.
13. physical partition of input data medium, e.g., Page 1, Page 2, etc.
14. point-in-time, i.e., date.

Identification Specifications

The student identifier and procedures for its use must produce a pupil identification, or code, that possesses the following characteristics:

1. reliability
2. uniqueness along certain dimensions
   a. temporal unit, i.e., how long is I.D. code unique?
   b. physical location unit, e.g., school, district, etc.
   c. . . .
3. ability to link student code with identifiers 1 through 8 in Section III, e.g., when a data base is compiled, a researcher should be able to retrieve scores for a given unit, school, district, etc.
4. machine readability. This is especially important when tests are input by a source automation device, such as an on-site scanner.

5. human readability. The individual name and class/grade should be readable by the user.
6. student usability by Grade N. While it is not determined that students will use the identifier as a matter of general procedure, the device should lend itself to successful student use by a grade level to be determined at a later date.
7. cost feasibility - one to three percent of total student cost for IMS when identifier device is installed on a large scale.

Work to be Completed

The basic task to be performed is the development of a device and appropriate procedures that will produce a unique student identifier (code, name and grade) as described in Section III to the specifications listed in Section IV. Parts of this problem have already been addressed and some solutions have been advanced.

Several questions and their possible answers are presented below.

Question. How much identification material must be generated for each physical unit, i.e., page of input?

Answer. It appears that identifying information from nation to school (Numbers 1-7 in the hierarchy) can be considered one-time entries to a "static" data base. Instructional program identification through page identification (Numbers 10, 12, and 13) are presently handled in the printing process. Computer codes and alphanumeric listings are pre-printed

on each page. (Group within program - Number 11 - is not dealt with in this fashion and remains a special case for this study.) Point-in-time is currently generated as date of output reports. A procedure for generating a date of testing would be desirable.

It would appear, then, under the present operating conditions of IMS that the ability to identify individual and grade/class in both machine and human readable form would meet present requirements for source data identification.

Question. How will the "group within program" identifier be handled?

Answer. In the initialization process, each student can be assigned a group code. During instruction, new assignments to groups can be made and this part of the code may become a dynamically generated variable.

Question. How many instructional systems must be linked to each individual?

Answer. Initially one. Then four, perhaps by midterm during school year 1972-73. The number may eventually reach ten.

Question. How much identification information must appear on each physical partition of input medium, i.e., test sheet?

Answer. Numbers 8-13, with the exception of 11, in the hierarchy - class/grade through page code - should appear in coded and written form on each page of pupil input. When there is a one-sheet, two-sided test, it is sufficient if student name and class/grade appear in human readable form on the one side only.

Question. How are machine readable marks generated on test sheets?

Answer. In two ways. Currently in two programs, students make marks on test sheets to indicate an answer choice. In three other programs, the teacher asks questions of students individually and then marks the response sheets according to correct or incorrect response.

Question. On the teacher-marked sheets, the performance of ten students on a unit test is recorded on a single sheet. The test sheets containing student-made marks measure performance of one student only. Should the identifier device be capable of handling both cases, i.e., student-made and teacher-made marks?

Answer. It is most desirable that this be so. However, if it is determined that one device cannot handle both cases, then the student-marked test sheets should take priority. The lack of ability to make the same marking device compatable to both cases should not impede successful completion of a coding device for student-marked test sheets.

Question. Do the proposed coding criteria allow for following students as they move from class to class, school to school, or district to district?

Answer. At the present time, no. Such capability would be possible by assigning a unique number, e.g., Social Security Number, to each individual and then linking this number to the identification code proposed above. However, a cost and work effort analysis should be performed before SWRL attempts to develop the capability of following every student through his educational progress. A data base could be developed which contains

"pointers" to his previous class identification code and the code of the new class. Procedures for setting this information into the data base would have to be developed.

Question. How "unique" must the pupil code be?

Answer. Not completely decided. At minimum a code should be unique for each student on a given unit test. More likely, the code should be assigned for at least one school year. The question of "location" uniqueness, i.e., a unique number for each individual across school, district or large administrative organization is addressed, but only partially answered above.